Aeronautical Systems Center
Major Shared Resource Center

Scientific Visualization Laboratory
User's Guide

Release: July 8, 2004

Release Notes

Release 1.0
- Issued April 8, 1997.
- Initial release.

Release 1.1
- Issued August 15, 1997.
- Updates to directory structure and modified cover.

Release 1.2
- Issued December 11, 1997.
- Format changes made to standardize all users' guides.

Release 1.3
- Issued September 22, 1998.
- Appendix added.

Release 1.4
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- Information updated.

Release 1.5
- Issued May 1, 2000.
- Information updated.

Release 1.6
- Issued May 25, 2001.
- Information updated.

Release 1.7
- Issued Oct 22, 2001
- Information updated.

Release 1.8
- Issued Dec 6, 2002
- Information updated

Release 1.9
- Issued July 25, 2003
- Information updated

Release 2.0
- Issued July 9, 2004
- Information updated

Table of Contents

2.4 Introduction

This document provides an overview to using the Scientific Visualization Laboratory (SVL) at the **A**eronautical **S**ystems **C**enter **M**ajor **S**hared **R**esource **C**enter (**ASC MSRC**) and highlights the hardware and software configuration in place at the time of publication. The laboratory is located at Area B, Bldg. 676, Room 227a, Wright-Patterson Air Force Base near Dayton, Ohio.

The SVL is open to on-site users from 6 am to 6 pm Eastern Time (ET) Monday through Friday, excluding Federal Holidays.

In order to have access to the Scientific Visualization Laboratory computer resources, the user must have a valid ASC MSRC user account. With the exception of scheduled maintenance times, remote users may access computer resources 24 hours a day, 7 days a week via network or dial-in service from a properly secured system.

Computer resources (e.g. ImmersaDesk, workstation consoles, printers, Video Preparation Facility, DVD+CD/RW, etc.) are normally available on a first-come first-served basis to **on-site** users. The SVL workstations and servers are fully integrated with the rest of the ASC MSRC environment. The DELL Linux PC in the SVL utilizes a DVD+RW/CD-RW directly connected to the network for improved portable data archival/storage.

For information regarding the ASC MSRC computing environment, SVL Tour requests, the SVL computing environment or to contact the ASC MSRC Customer Service Center, please refer to Section 5 of this document.

2.5 Goals

The goal of the ASC MSRC is to provide users direct access to high-performance visualization equipment and software. System resources are intended to be available on a self-serve basis to any ASC MSRC user, with provisions for use by non-MSRC users.

1.2 User Responsibilities

Users are responsible for the following when utilizing the Scientific Visualization Laboratory:

2.6 Familiarization with this guide.
2.7 Data and/or graphics preparation.
2.8 Provide own video and storage media for data to be taken off site.

2.9 Introduction continued.

1.3 SciVis Lab Usage Policy

The Aeronautical System Center (ASC) Major Shared Resource Center (MSRC) Scientific Visualization Laboratory graphics systems are intended for the express purpose of pre- and post-processing, analysis, and visualization of data. These systems are not to be used as a replacement or substitute for any high performance-computing platform.

The ASC MSRC Software Working Group identifies and categorizes software application resources to be supported by the Center. The ASC MSRC reserves the right to restrict the use of any application on Scientific Visualization graphics systems that is determined to be computationally intensive. A list of application software ready and available for use on these systems is posted on the ASC MSRC Extranet website.

http://www.asc.hpc.mil/software/index.php

Customers of the Scientific Visualization Laboratory (SVL) are permitted to execute serial and parallel codes from within their personal accounts. These graphics systems are utilized in an interactive environment. Therefore, the SVL reserves the right to restrict the number of processors a customer utilizes on a system regardless of the origin of the software executable.

The Laboratory also reserves the right to suspend or terminate any user processes in the event that additional resources are necessary to meet scheduled or urgent requirements.

If you have any questions concerning this policy, please contact the ASC MSRC Accounts Center at 1-888-MSRC-ASC (1-888-677-2272) or via e-mail at hpc-accounts@asc.hpc.mil.

2. Hardware

Scientific visualization resources of the ASC MSRC consist of a wide variety of graphic workstations and software. Only unclassified visualizations are supported. The equipment is designed to provide high quality graphics in a tightly integrated environment of graphics and video.

To review the most current list of equipment available, please refer to Section 5 of this document.

2.10 Scientific Visualization Equipment

2.10.1 Computers

The ONYX3 and ONYX2 systems are configured with 4 and 2 graphic consoles, respectively, as noted in the table below.

Silicon Graphics

Platform	Graphics	# CPU	Processor(s)	Memory	Workspace	Option
ONYX3	Infinite Reality2/3/4®	16	R12K / 400 MHz	32 GB	~7 GB	ImmersaDesk DPLEX
ONYX2	Infinite Reality3®	16	R14K / 500 MHz	16 GB	~7 TB	
O2	CRM	1	R12K / 300 MHZ	1 GB	18 GB	DigiCam / Audio
LINUX PC	NVIDIA	1	Pentium® 4 1.7 GHz	526 MB	N/A	DVD+RW/CD-RW ZIP/Scanner

GB = Giga Byte = 1,000,000,000 Bytes
TB = Terra Byte = 1,000,000,000,000 Bytes

2.10.2 SVL (ONYX) Features

ImmersaDesk®

The ImmersaDesk® by Pyramid Systems, Inc. is a projection-based virtual reality system that allows group viewing of the virtual reality environment. Imagery is projected onto a 4 X 5-foot rear-projection screen set at a 45-degree angle. The size and position of the screen give an ieldview wide-angle view and the ability to look down as well as forward. This technology provides the researcher a unique way of visualizing resultant data and sharing information with associates. The user's graphics code must be combined with the appropriate Cave Automatic Virtual Environment (CAVE) libraries located on the ONYX3 system (refer to Section 3.3.3). The resultant executable must be run on the ONYX3 system to be viewed on the ImmersaDesk®.

Utilizing Crystal Eyes3® LCD stereo glasses and head and wand tracking, the researcher can manipulate 3D objects within the virtual environment for closer inspection of data.

Vendor Links:

ImmersaDesk (http://www.fakespace.com)
CAVE Libraries (http//www.vrco.com)

2.1.2 SVL (ONYX) Features Continued.

DPLEX

The Digital Video Multiplexer Option (DPLEX) is available for local SVL usage on a scheduled basis. This capability permits the user to utilize the power of the InfiniteReality2®, InfiniteReality3®, and InfiniteReality4® graphics pipes available on the ONYX3 and to combine the generated image onto a single display console.

2.1.3 Other Equipment

2.1.3.1 Printers

2.1.3.1.1 Hewlett Packard 4500DN Color Laser Printer

Printer capabilities include plain paper and transparency for high quality color printing.

2.1.3.1.2 Hewlett Packard 4M Plus B&W Laser Printer

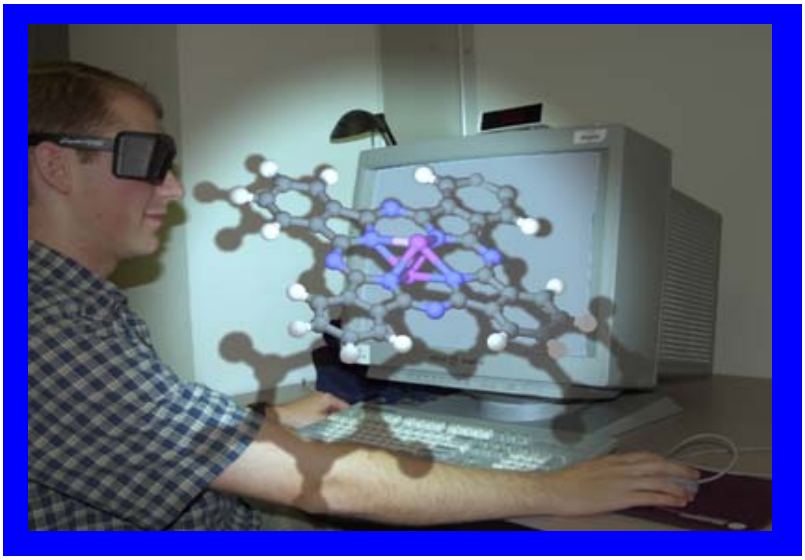
Printer is capable of high-quality black and white plain paper printouts.

2.1.3.2 Epson Scanner (DELL Linux PC)

Epson Perfection 1660 Photo Scanner, 1600 X 3200, 48 bit, built in 35mm film adapter and USB interface. A graphical user interface (GUI) is available for the Linux OS. See Appendix A.1 for scanning procedures.

2.1.3.3 Stereo-emitters (ONYX2 and ONYX3)

Several displays within the SVL have been configured with **stereo-emitters** to provide local researchers the ability to utilize Virtual Reality (VR) to more fully explore their data and models in 3D. To properly view VR, the researcher must use the stereo-emitter in conjunction with the **Crystal Eyes3® shutter glasses**, also available in the SVL.



3 Software

Due to licensing agreements with application vendors, some software packages are restricted to specific systems. On-line manuals are available for each application listed below.

Other software applications are also available for execution on SVL systems. Please refer to Section 5 of this document for more information about the list of available software.

3.1 Visualization Packages

Product Name	Command Name	*Additional Features/Notes*
AVS5	avs	Animator
AVS/EXPRESS	vxp, express	Visualization Edition Developers Edition
CATIA Converter	theorem_solutions	Works with Unigraphics
EADSim	eadsim	
ENSIGHT	ensight7 *[-gold]*	*-gold* enables Stereo Mode
FAST	fast	
FIELDVIEW	ieldview, fv	
GRADS	grads	
GNUPLOT	gnuplot	
GRIDTOOL	gridtool	CAD Unstructured GRIDS
IDL	idl	
IMTOOLS	imadjust imcat imcltroll imcomp imconv imcopy imdissolve imfile imfill imflip imformats imgray imhist imkey imlighten immono impaste imroll imrotate imscale imshear imsplit imstoryboard	- for adjusting image colors, desaturate, brighten, etc. - for concatenating images into multi-image files. - to cycle a color lookup table. - to digitally composite images. - for the image file conversion routine. - to copy a portion of an image to a new file. - dissolve any field between two images and store. - to discern the image format of a file. - to fill a region of an image with a color or gradient. - flips images vertically or horizontally. - lists information on image file formats. - converts an image to grayscale. - computes an image histogram. - keys a foreground image over a background image. - lighten or darken an image. - converts an image to monochrome. - paste image on background and store in file. - cycles an image horizontally or vertically. - rotate an image. - scale an image and store in a file. - shear an image horizontally or vertically. - split apart multi-image files. - paste images together to create a storyboard

3. 1 Visualization Packages continued

Product Name	**Command Name**	***Additional Features/Notes***	
KHOROS PRO	*cantata* or *khoros*		
MAPLE 6	maple		
MATHEMATICA	mathematica		
MATLAB	Matlab *[-nojvm]* *[- nosplash]* *[- nodesktop]*	*[optional switches for command-line mode]* Compiler CPP Math Library Graphics Library Simulink ToolBoxes Control Compiler Fuzzy Logic Image Processing Mu-Synthesis Neural Network Optimization Robust Control Signal Processing Spline Simulink Statistics	
MATLABMPI	matlabmpi	*Parallel Matlab Utility*	
PRO/ENGINEER	proeng *[23, 24, 25]*	Pro/PROCESS for ASSEMBLIES Advanced Designer Pkg. II Pro/NOTEBOOK Pro/ASSEMBLY Pro/FEATURE Pro/DETAIL Pro/INTERFACE Pro/SURFACE Pro/PLOT Pro/REPORT Pro/4DNAVIGATOR LIC.	Pro/MECHINICA CUSTOM LOADS Ver. 23 (2001) Process Modeler Pkg. (Formerly ADP III) Pro/NOTEBOOK Pro/ASSEMBLY Pro/Interface for CATIA Pro/FEATURE Pro/DETAIL Pro/INTERFACE Pro/SURFACE Pro/PLOT Pro/REPORT Pro/4DNAVIGATOR LIC.
PV-WAVE	pvwave, wave	GTGrid	
TECPLOT	tecplot	CDF Analyzer 4.0, MESA off-screen rendering	
UNIGRAPHICS	ug ugmenu	CAST tutorials	
VIS5D	vis5d, vis5d+	Stereo Capable	
VIZSERVER	VizServer	Video compresson, remote Visualization	

3.2 Compilers and Debuggers

All Scientific Visualization Laboratory computer systems have the following compilers and debuggers available with three different Application Binary Interfaces (ABI):

Product Name	Command Name	*Description*
C	cc	MIPS C compiler
C++	CC	MIPSpro C++ compiler
Fortran 77	f77	MIPSpro Fortan 77 compiler
Fortran 90	f90	MIPSpro Fortran 90 compiler
cvd	cvd	Workshop debugger
dbx	dbx	Source-level debugger
gdb	gdb	GNU Debugger
gcc	gcc	GNU project C and C++ Compiler
g++	g++	GNU project C and C++ Compiler
Totalview	totalview	GUI Debugger

3.3 Other Software

3.3.1 Performer Libraries

Location: ***/usr/share/Performer*** on **svw10**

/usr/share/Performer/src/pguide – small examples
/usr/share/Performer/src/sample – sample applications
http://www.sgi.com/software/performer

3.3.2 Inventor Development Kit

Location: /usr/share/src/Inventor/* - Source to Inventor samples and examples
/usr/share/data/models/* Sample 3D data files
http://www.sgi.com/Technology/Inventor.html

3.3.3 CAVE Libraries

Location: ***/usr/local/CAVE/lib*** on the **ONYX3 (svw10) system**

- Sample programs are located in */usr/local/CAVE/examples.vendor/*
- Copy the *examples.vendor* directory to your $HOME or */workspace*
- Check the Makefile and/or README for compile instructions

3.3.4 OpenGL VizServer

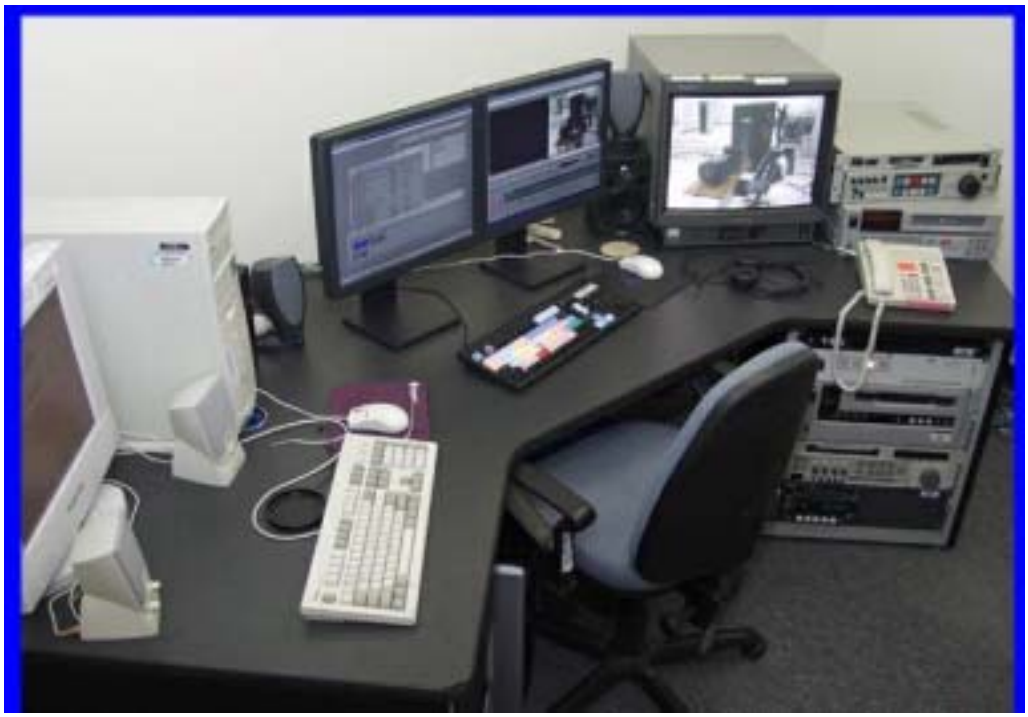
Location: ***/usr/sbin/vizserver*** on selected client systems.

- See SVL staff for assistance

4. Video Preparation Facility

The computational and visualization resources of the ASC MSRC are greatly enhanced by the Video Preparation Facility (VPF). The **VPF** offers the users professional quality video and audio productions. The **VPF** can convert scientific visualizations and animations into digital movies to use in presentations or as a stand-alone production on videotape or DVD.

The video production facility specializes in Video and Audio Editing as well as Format Conversion.



Video and Audio Editing

The Avid Xpress is a Windows NT base video editing system that is capable of producing broadcast quality videos. The Avid Xpress offers an impressive pallet of 3D and 2D effects, picture-in-picture effects, title and graphic overlay, picture composting, and keying effects. Audio editing and equalization is also performed on the Avid Xpress, resulting in a very high quality finished product.

Some other noteworthy capabilities of the Avid Xpress are its ability to quickly turn PowerPoint presentations, along with a recorded narrator track, into professional video presentations. Those presentations can then be released to the presenter's audience on videotape or in the form of electronic media, such as AVI, MPEG, Real Media, QuickTime, and SGI movies. Another capability worthy of mention is the Avid Xpress' ability to import a series of still images, which can then be played back in succession.

4. Video Preparation Facility continued

Format Conversion

The ASC MSRC Video Preparation Facility has a bank of video tape recorders and players of many formats to allow users to convert a tape recorded in one format into another format. For example, a tape-recorded on a ¾" Umatic Tape can be converted to the more widely used VHS format. The following are a list of tape formats available in the **VPF**:

- VHS
- Super VHS
- High 8 and 8mm Video Tape (no film capabilities)
- ¾" Umatic
- Betacam SP
- Digital Betacam
- DVC PRO
- DVD
- DV

* Please note that all formats mentioned are based on the NTSC standard. There are no capabilities in the VPF for conversion of videotapes recorded in foreign standards used, such as PAL and SECAM.

Video Preparation Services

A full time staff member is responsible for performing Video Preparation Services for lab users. Contact the ASC MSRC Help desk via email at **msrchelp@asc.hpc.mil** or 1-888-677-2272 for more information.

5. Reference

The most current information available regarding the ASC MSRC or the SVL can be found at the locations noted within this section.

5.1 SVL Information References

SVL supported hardware:
http://www.asc.hpc.mil/hardware/sciviz.php

SVL supported software:
http://www.asc.hpc.mil/consolidated/softwareASC.php?search=SCIVIS

SVL E-News:
http://www.asc.hpc.mil/sciviz/Enews.php

5.2 ASC MSRC Documentation and Contact References

ASC MSRC User Guides and Documentation:
Available on-line in either Portable Document Format (PDF) or PostScript (PS) format at:
http://www.asc.hpc.mil/

ASC MSRC supported hardware:
http://www.asc.hpc.mil/hardware/index.php

ASC MSRC supported software:
http://www.asc.hpc.mil/software/index.php

Customer Assistance:
The ASC MSRC Customer Service Center can be reached by:

e-mail:	**msrchelp@asc.hpc.mil**	
phone:	(937) 255-0194	– local access;
	785-0194	– DSN;
	1-888-677-2272 (1-888-**MSRC ASC**)	– toll free;
web:	**http://www.asc.hpc.mil/**	

6. TUTORIAL/NEWSLETTER

AVS – The getting started tutorial included in **onsite** documentation.

- **Newsletter - http://www.avs.com/newsletter/Winter01/index.html**

EADSim – Support and product information
http://www.eadsim.com/

Ensight – The tutorial is included with onsite documentation.

- **Newsletter** - **http://www.ensight.com/services/services.html**

FAST – None

Fieldview – The **onsite** tutorials are included with documentation.

- Online PDF help files http://www.ilight.com/support.htm

GrADS - None

GridTool – Onsite - /app/gridtool/Section1-9.pdf

IDL - None

Matlab – Free Vendor supplied Interactive Webinars.
http://www.mathworks.com

- Accelerating MATLAB.
- DSP Blockset - New Features and Enhanced Capabilities.
- Controller Tuning & Plant Modeling
- Modeling RF Impairments with the New Communications Blockset.

- Vendor Seminars – (may not be local)
  http://www.mathworks.com
  - Real World Real-Time Signal Processing Systems
  - Signal Processing and Communications Design for Aerospace and Defense.
  - Test & Measurement in Aerospace and Defense.
  - **Newsletter** - **http://www.mathworks.com/digest_mw_mla**

MatlabMPI – see README file in /app/Matlab/MatlabMPI

Mathematica – Vendor Suppplied Online tutorials

- **Vendor Online Resource Library – http://www.wolfram.com/services**

Maple – Vendor Resources.

- **Online application center – http://www.maple6.com**

6 TUTORIAL/NEWSLETTER continued

ProEngineer – Tutorial files provided **onsite** (minimal documentation).

- /app/proengin/ptc23_i/proe2001/demos/demo/mdx/**tutorial1**
- /app/proengin/ptc23_i/proe2001/demos/demo/mdx/**tutorial2**
- /app/proengin/ptc23_i/proe2001/demos/demo/mdx/**tutorial3**
- **Vendor News** – **http://www.ptc.com/company/news/press/index.htm**
- **Web Cast Demos/Sneek Peeks**– **http://www.ptc.com**

Tecplot – Vendor online tutorials **– http://www.tecplot.com/tutorial/index.html**

- **Newsletter - http://www.tecplot.com/contours/index.html**

PVWave – See application Help Guide.
http://www.vni.com/index.html

Unigraphics – **CAST** – **On Site** training tutorials available with application documentation.

- **Newsletter – http://support.ugs.com/html/email.html**

APPENDIX

Appendix A.1 Image Scanning Procedures

1. Log into the SVL DELL Linux PC, workstation labeled "**svwwrk"**.

2. Place the item to be scanned in the scanner by lifting the cover and placing the item on the scanner's glass surface. Place the item facedown, with the top toward the scanner's cover hinge. Place the item all the way to the right edge of the scanner's glass surface.

3. Click the "**Red Hat**" icon and choose "**Graphics**" from the menu, then choose "**Scanning**" from the sub-menu.

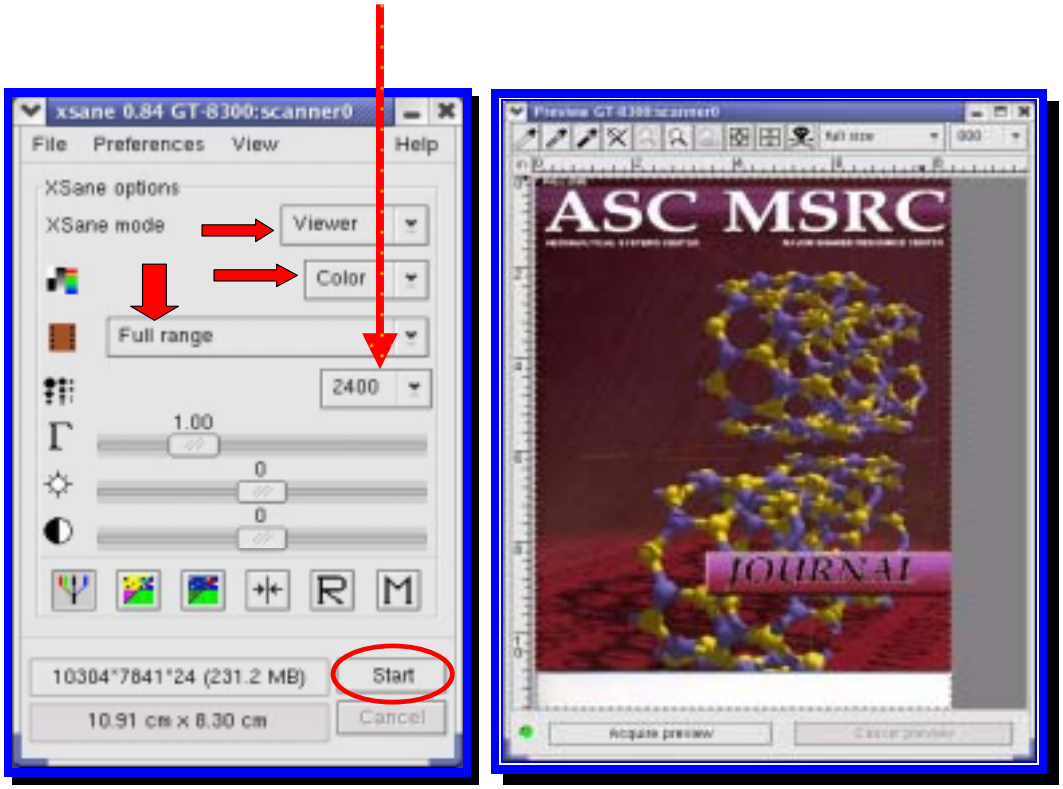
4. Choose "**Start**" from the XSane window to begin the preview scan process.

4.1 Adjustments: Viewer (Start Preview), Color, Range, and DPI.

4.2 Use the Preview pane to crop selected image:

In the preview window, select the desired portion of the image to be scanned. To do this, move the mouse pointer to the upper-left corner of the area you wish to scan. Press the left mouse button and drag the mouse pointer to the lower right corner of the area you wish to scan. The area will be enclosed by a box, which can be resized by using the above procedure or dragging the "handles" around the edge of the box with the mouse. Click, "**Acquire Preview**" for a new preview.

NOTE: A value of 72 is a recommended setting for density.



Appendix A.1 Image Scanning Procedures Continued

Choose "**File**", "**Save image**",

Supported filetypes:
Pnm and ps (and raw) are always available. The raw format is a 16 bit binary format. Some programs can read raw files as pnm-format. For the pnm format only 8 bit binary and ascii and 16 bit ascii are defined. We suggest not to use the raw format for storing images you want to view, it is meant for post-processing with programs you write yourself. The advantage is that this format produces much smaller files than the 16 bit ascii pnm format does.

The supported output formats depend on the bit depth of the scanned image:

1 bit/pixel black/white mode:
pnm = pbm, png
ps, jpeg and tiff are converted to 8 bit grayscale mode.

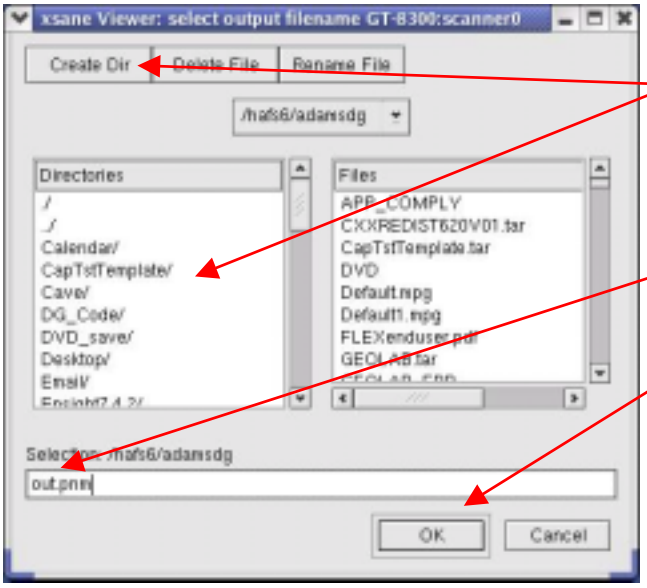
8 bits/pixel grayscale mode:
pnm = pgm, png, ps, jpeg and tiff

16 bits/pixel grayscale mode (9-16 bits):
pnm (ascii), png, raw and tiff

24 bits/pixel RGB-color mode (8 bits/color):
pnm = ppm, png, ps, jpeg and tiff

48 bits/pixel RGB-color mode (9-16 bits/color):
pnm (ascii), png, raw and tiff

Appendix A.1 Image Scanning Procedures Continued



Choose location to save file

Change file extension to the file type desired.

Click "OK", to save the file.

Appendix A.2 Remote Visualization Procedures

1. On the system you are using *outside of the ASC MSRC environment*, perform an "**xhost** SVLSystemName**.asc.hpc.mil**", where SVLSystemName is the SVL computer system, either Hostname or IP address, which you are permitting to display on your local system display.

   *Replace SVLSystemName (below) with actual machine Hostname (i.e. svw10, svw11, etc...)

   Example #1:

   local prompt> **xhost SVLSystemName.asc.hpc.mil**

2. Utilizing "**ssh**" or the Kerberos version of **telnet**, **rlogin**, or **rsh**, log into the system you supplied for <SVLSystemName>.

   Example #2:

   local prompt> **telnet SVLSystemName.asc.hpc.mil**

3. In the window logged into <SVLSystemName>, set the environmental display variable.

   Example #3:

   *Where ***local*** is the Hostname or IP address of the system on which you performed the "xhost" command in Step #1. The suffix "**:0**" (spoken as "***colon zero***") must be included.

   SVLSystem prompt> **setenv DISPLAY local:0**

FAQ/Troubleshooting

a. "I can't log into any ASC MSRC computer system."

Suggestions

1. If <SVLSystemName> doesn't work, use its associated IP address.
2. Has your local system been configured with the proper Kerberos software as mentioned in Step 2 above? If not, visit the ASC MSRC web site referenced in Section 5 of this document.
3. Is your local network down or has a new firewall been installed? If so, contact your network administration support.

   Note: *"ping" will not work coming into the ASC MSRC.*

4. Contact the ASC MSRC Service Center to open a trouble ticket. Please refer to Section 5 of this document.

b. "I successfully logged into an SVL system, but I cannot display graphics back to my local workstation. "

Suggestions

1. Was the "**xhost**" command as shown in Example #1 on your ***local*** workstation?
2. Did you perform the "setenv" command as shown in Example #3?
   Note: The suffix ":0" is critical. The suffix "**:0**" (spoken as "***colon zero***") must be included.
3. If you are using a PC, additional software may be required from your System Administrator to allow X-terminal emulation. Type "**xterm**" in the window logged into the SVL system. If an X-terminal window appears on your local workstation display, refer to Section 5 of this document and contact the ASC MSRC Service Center to open a trouble ticket. If the window does not appear, contact your local System Administrator.

Appendix A.2 Remote Visualization Procedures Continued

4. If you are using a UNIX system, type "**xterm**" in the window that is logged into the SVL system. If an X-terminal window appears on your local workstation display, refer to Section 5 of this document and contact the ASC MSRC Service Center to open a trouble ticket.

Appendix A.3 Recording Computer Animation to Video Tape Tips

1. A format of **720 x 486 pixels** is the best size and resolution for recording.

2. Animation can be recorded dynamically from your application or a series of RGB images can be made into an SGI movie. In house conversion routines, such as ***imtools***, support a wide range of image input and output formats.

3. With the assistance of SVL staff, the animation can be placed directly on videotape or edited to provide enhanced video presentation features.

Appendix A.4 Guide to Movie Capture

Animations appearing on the display monitors in the SVL may be captured directly to a file for later play back, recorded to videotape or converted to a file to be used in a presentation. It is advised for smooth play back that a display window be no larger than **720 x 486 pixels**.

The procedure is as follows:

- With the animation ready to be displayed, invoke the Media Recorder application by either typing "**mediarecorder**" in a UNIX window or by selecting the **mediarecorder** icon from the Icon Catalog.

- Using the mouse, place the cursor over the icon representing a film segment. While pressing the left mouse button, slide the cursor over the sub-menu "***Movie from screen using software >***", continue to slide the cursor over "***Select area…***" Once this selection is highlighted, release the left mouse button to complete selection of this option.

- Follow instructions on screen and draw window around area for capture. When area is selected click the red dot to start recording. Stop recording by clicking the blue square. The software will process the movie to file. The movie file name will appear in SGI movie format with the **.mov** extension.

- At this time you can preview the movie by double clicking on the movie file name.

- The file, at this time, may be converted by right clicking on the file name and launching the mediaconvert application. Two popular choices are a QuickTime or AVI file for display in a presentation. If the animation is to be played in a Powerpoint presentation choose the AVI file type and under video parameters select "***Indeo"*** compression. The default name for output is outfile.avi. Change "outfile" to the desired file name, but retain the **.avi** extension. Click start for the conversion to begin.

If you have questions or need assistance, please refer to Section 5 of this document to contact a member of the SVL staff.

Appendix A.5 Guide to use DVD/ZIP/CD drive for LINUX PC

Question: "*Can I burn a CD-ROM readable for my PC? SGI?"*
Answer: Yes, images are iso9680. Use ***XCD-Roast*** screenshots below.

Question: "What format do I use if I want to burn a DVD*?""*
Answer: The **ONLY** format supported in the SVL is **DVD+RW.**

IMPORTANT: you must bring your own media!
(Compatible brands include: Sony, HP C8008A, Verbatim 93717 DVD+RW).

NOTE: DVD recorder is command line only!

From the **Red Hat** Icon, choose "**Start**"->"**System Tools**"->"**Terminal**"

- Opens a terminal on the desktop
- Execute commands from the terminal (below) to use DVD+RW

Insert DVD+RW

- Into the DVD DISC drive (lower drive)

To format the DVD+RW (if needed)

- /usr/local/bin/dvd+rw-format /dev/scd1

Write files for the **1st** time (to a newly formatted disc)

- /usr/local/bin/growisofs –Z /dev/scd1 –R –J <*your_files*>

Adding files to a formatted & previously written to disc

- /usr/local/bin/growisofs –M /dev/scd1 –R –J <*your_files*>

***There is no method to delete files from DVD+RW, you must reformat and write the files you want to keep.**

NOTE: The DVD disc should be readable under Windows and Linux.

NOTE:

Approximately 4.4GB is the maximum space you will be able to utilize on a 4.7 GB DVD+RW.

Appendix A.5 Guide to use DVD/ZIP/CD drive for LINUX PC Continued

NOTE:

The maximum file size for a single file that can be written to the DVD disc is 2 GB.

You cannot burn a new directory or file structure on the DVD+RW in the space above 4 GB, BUT an new file that was started below the 4 GB space can continue to be burned above the 4 GB limit.

If you would like to burn all the files in a directory to include the sub-directories, just use the directory name in the DVD command line.

To reformat the DVD (erase existing data) you will be prompted to include the command line option "–leadout" with the format syntax.

A DVD+RW can be reformatted 1,000 times before it becomes unusable.

If you require a single file larger than 2 GB (or a collection of files contained in a compressed format that is 2GB+) to be saved to a DVD, the SVL staff can create a DVD-R for you. Again, you must provide your own media.

See the SVL staff, or email the ASC MSRC help desk at msrchelp@asc.hpc.mil for assistance.

Appendix A.5 Guide to use DVD/ZIP/CD drive for LINUX PC Continued

Question*: "How do I start the CD-RW Burner Software?"*
Answer: - From the **Red Hat** Icon, choose "**Start**"->"**System Tools**"->"**Terminal**"

- Opens a terminal on the desktop, type *"xcdroast"*

or

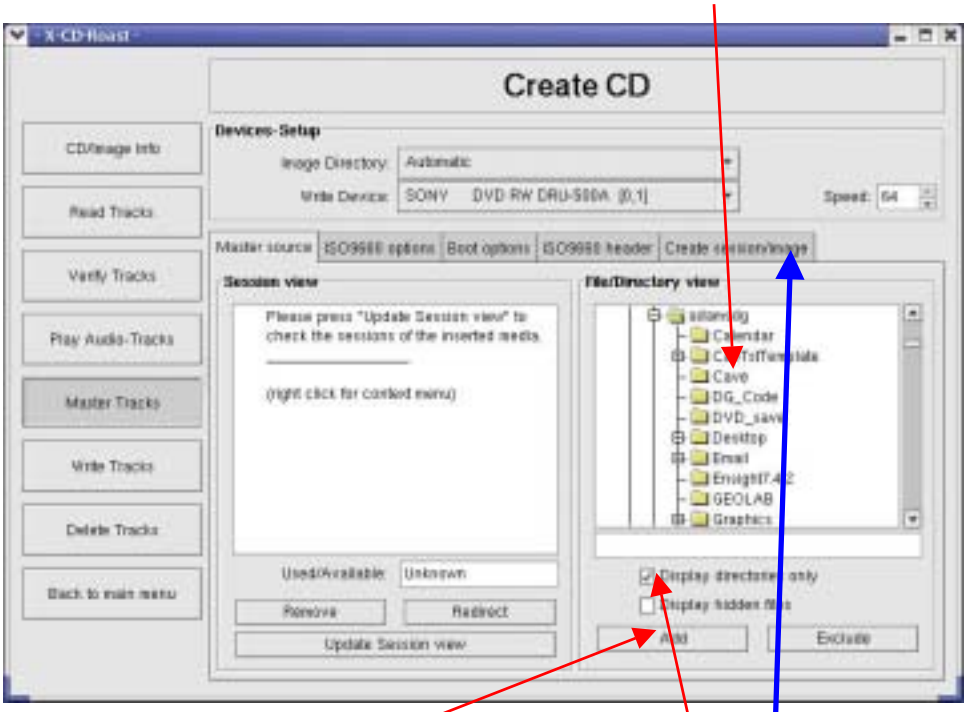
From the **Red Hat** Icon, choose "**Extras**->**Others**->**X-CD**" from the drop menus.

Choose: CreateCD ----> to Create a custom CD
Choose: Exit ---> To Quit

Appendix A.5 Guide to use DVD/ZIP/CD drive for LINUX PC Continued

Choose “Master Tracks” to locate files to write to CD

File area to be selected



To see dir. only

To add file/dir.

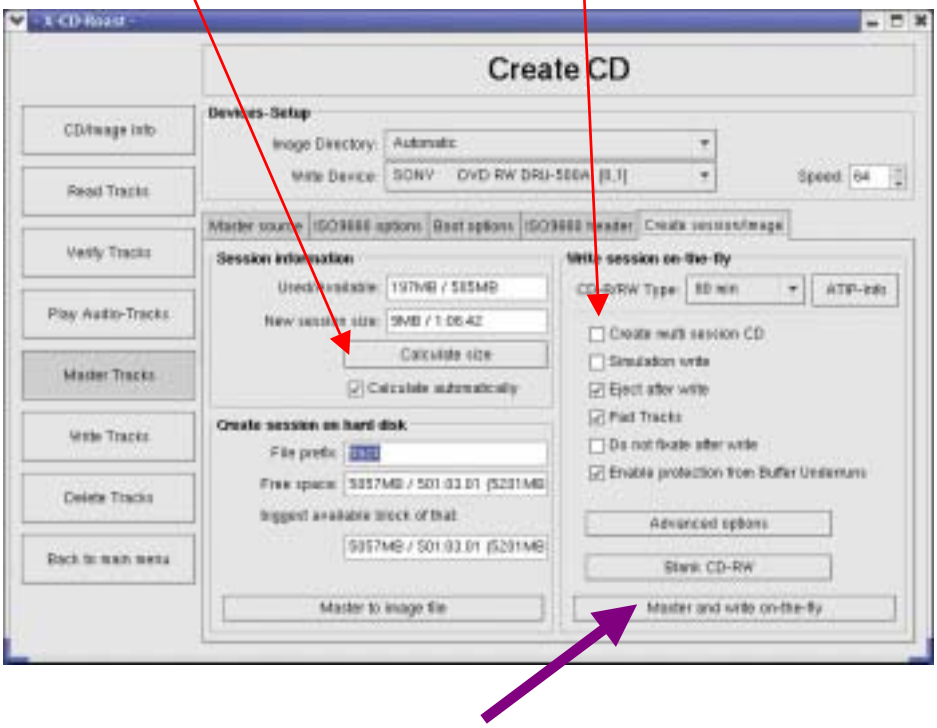
When you are ready to write the files to the CD choose Create Session.

Appendix A.5 Guide to use DVD/ZIP/CD drive for LINUX PC

Continued

Recalculate size

Multi-session CD?



To start the "burn" on the CD

Appendix A.5 Guide to use DVD/ZIP/CD drive for LINUX PC

Continued

Mounting the ZIP drive – Unmounting the ZIP drive

mount /mnt/zip	*umount /mnt/zip*

* You must umount the ZIP drive BEFORE removal or ZIP may be damaged!

Mounting the CD drive – Unmounting the CD drive

mount /mnt/cdrom	*umount /mnt/cdrom*

*You must umount the DISC drive BEFORE removal or DISC may be damaged!

Mounting the DVD drive – Unmounting the DVD drive

mount /mnt/cdrom1	*umount /mnt/cdrom1*

*Only mount/umount the drive for READING

**You must umount the DISC drive BEFORE removal or DISC may be damaged!

Appendix A.6 Visualization Package Descriptions

AVS5

"*AVS* includes a comprehensive suite of data visualization and analysis techniques for a complete Visual Computing Environment. AVS incorporates both traditional visualization tools such as 2D plots and graphs and image processing as well as advanced tools such as 3D interactive rendering and volume visualization. Provided along with AVS are intuitive, easy-to-learn interfaces to the most frequently used visualization techniques. These interfaces, or "viewers", can help you explore your data immediately -- even before you begin to tailor AVS for your specific needs. Viewers included are the Data Viewer, Geometry Viewer, Image Viewer, and Graph Viewer. The Data Viewer provides a comprehensive suite of visualization techniques. The Geometry Viewer provides an interactive 3D Geometric Display, a choice of Render Modes: Wireframe, Surface, Surface Transparency and Reflectance, Multiple Light Sources, 2D/3D Texture Mapping, and Multiple Viewports. The Image Viewer provides Real-time Image Pan and Zoom, Region of Interest Operations, FlipBook Animation, 8 bit, 16 bit, and 24 bit Support, Look-up Table Operations, and Data Resizing Operations. Advanced Visualization Techniques include: Streamlines and Particle Advection, Image Processing, Volume Rendering, Isosurfaces and Slice Planes, and Comprehensive Finite Element Data Visualization."

Application Name: **avs**

For further information: (http://www.avs.com)
(http://help.avs.com/AVS5/faq)

AVS/EXPRESS

"*AVS/EXPRESS VISUALIZATION Edition's* visual programming environment makes it easy for users to quickly and interactively visualize their data. It displays an application's structure in a flowchart-type graphic where the user graphically connects objects, called modules, together to build a visualization network. The network becomes an application, which can be saved, reused, and modified. This gives users the ability to experiment with their data by building custom networks until they are satisfied with the results.

AVS/Express Developer Edition users have access to a wealth of fine-grain visual programming objects that provides a complete development environment. High-level objects are available, such as 2D and 3D graphics viewers, but the Developer Edition also gives the developer the ability to drill-down and reconfigure any aspect of the system (for example, the number of lights in a viewer)."

Application Name: **vxp** (Visualization Edition)
express (Developers Edition)

For further information: (http://www.avs.com)
(http://help.avs.com/EXPRESS/faq)

Appendix A.6 Visualization Package Descriptions continued

EADSim
"The Extended Air Defense Simulation (EADSIM)" is a many-on-many simulation of air, missle and space warfare. It provides analysis, training, and operational planning to the wartime fighter in one package. EADSIM is one of the most widely used simulations in the world with over 39o user agencies worldwide.

Application Name: **eadsim** (GUI)

*For Futher information: (*http://www.eadsim.com/ *)*

ENSIGHT
"*ENSIGHT"* is an advanced software tool for the interactive visualization and animation of results data from a wide variety of finite element modeling applications in fields such as CFD, combustion modeling, injection molding simulation, and structural deformation. EnSight can load and visualize multiple scalar and vector variables simultaneously. Variables can be selectively loaded or unloaded to conserve memory. Variables from different time steps can be shown simultaneously. EnSight has full support for all types of transient and periodic data (rotational, translational, and mirror). EnSight provides 1D, 2D, and 3D clipping with a variety of linear, planar, and quadric tools. The tools can be positioned interactively or via numeric type-in. Clips become parts, which can be manipulated individually or in groups and can be used for subsequent operations (e.g. as parent surfaces for contours, vector arrows, or even additional clips). Elevated surfaces - a graphic manifestation of a variable created by projecting away from a parent part with surface height parameterized by the variable - can be created. Scale, sidewalls and offset are controllable. Profile plots (the 2D equivalent of an elevated surface) can be created. Profiles visualize values of a variable along a (not necessarily straight) line with a variable height plot. A full-function 2D plotter is provided that can be used either in conjunction with EnSight or stand-alone. EnSight can output images to disk files or direct to printers in the following formats: PostScript, EPS, Silicon Graphics RGB, TARGA, PICT, and PCL.

"EnSight Gold" contains all of the features found in **EnSigh**t, as well as also contains the following additional features; parallel processing on SMP systems for more than 2 CPUs; the ability to update a block structured part after its creation; support for VR environments; a New user-reader routines to permit faster data loading, similar to Gold file format. Ensight Gold also contains several performance options including line culling for faster line performance; Duplicate edges of polygons are removed; a faster transparency option; point cloud bounding box option, allows 5x rendering speedup; partial point/partial polygon rendering for faster display mode; and Enhancements to utilize multiple graphics pipes on SGI systems enabling parallel rendering for large models, and for advanced display systems having one or more parallel display walls."

Application Name: **ensight7**
ensight7 –gold

Ensight7 –gold is Stereo Capable 

For further information: (http://www.ceintl.com)

Appendix A.6 Visualization Package Descriptions continued

EADSIM

"*The Extended Air Defense Simulation (EADSIM) is a many-on-many simulation of air, missile and space warfare. It provides analysis, training, and operational planning to the war-fighter in one package. EADSIM is one of the most widely used simulations in the world. EADSIM is managed by the Tes tbed Product Office, U.S. Army Space Missile Defense Command, as the executive agent for the Ballistic Missile Defense Organization (BMDO).*

Application Name: **eadsim**

For additional information: (http://www.eadsim.com)
Managed by Teledyne Engineering (http://www.tbe.com/products/ext_air_defensesim.asp)

FAST

"*FAST* is a software environment for analyzing data from numerical simulations. Though somewhat tailored towards CFD visualization, this package can be used to visualize any scalar and vector data that can be mapped to either a Plot3d or Unstructured grid. The package includes tools for such things as calculating user defined scalar and vector quantities from the original data, generating surfaces, particle traces, and isosurfaces as well as determining topological features of vector fields."

Application Name: **fast**

For additional information: (http://www.nas.nasa.gov/Software/FAST/fast.html)
(http://www.nas.nasa.gov/Software/FAST/faq.html)

FIELDVIEW

"*FIELDVIEW* is an advanced, easy to use software package designed specifically for CFD (computational fluid dynamics) data visualization. The latest release of FIELDVIEW contains major enhancements to its analysis and presentation capabilities, as well as groundbreaking technology for large, transient CFD problems. FIELDVIEW contains a full suite of data analysis tools, in an interface that has been judged the easiest to use in the industry. With just a few clicks of the mouse, you can read data from any leading CFD code, and analyze the results right on your desktop. Powerful features such as cutting planes, 2D plots, probes, streamlines and integration can help you track flow rates, find re-circulation zones, or study the boundary regions or bulk flow areas quickly and easily. FIELDVIEW also contains full transient data support and output options including: MPEG, JPEG, GIF, TIFF, BMP and high quality "move-draw" PostScript."

Application Name: **fieldview**

Fieldview is Stereo Capable 

For further information: (http://www.ilight.com)

Appendix A.6 Visualization Package Descriptions continued

GrADS

"*GrADS*", The Grid Analysis and Display System is an interactive desktop tool that is used for easy access, manipulation, and visualization of earth science data. The format of the data may be either binary, GRIB, NetCDF, or HDF-SDS (Scientific Data Sets). GrADS uses a 4-Dimensional data environment: longitude, latitude, vertical level, and time. Data sets are placed within the 4-D space by use of a data descriptor file. GrADS interprets station data as well as gridded data, and the grids may be regular, non-linearly surfaced, gaussian, or of variable resolution. Data from different data sets may be graphically overlaid, with correct spatial and time registration. Operations are executed interactively by entering FORTRAN-like expressions at the command line. Rich sets of built-in functions are provided, but users may also add their own functions as external routines written in any programming language.

Application Name: **grads**

For further information: (http://grads.iges.org/grads/grads.html**)**

Appendix A.6 Visualization Package Descriptions continued

GNUPLOT

"*GNUPLOT"* is a command-line driven interactive function plotting utility. Gnuplot handles both curves (2 dimensions) and surfaces (3 dimensions). Surfaces can be plotted as a mesh fitting the specified function, floating in the 3-d coordinate space, or as a contour plot on the x-y plane. For 2-d plots, there are also many plot styles, including lines, points, lines with points, error bars, and impulses (crude bar graphs). Graphs may be labeled with arbitrary labels and arrows, axes labels, a title, date and time, and a key. The interface includes command-line editing and history on most platforms."

Application Name: **gnuplot**

For further information: (http://www-vis.lbl.gov/software/gnuplot.html)
(http://www.ucc.ie/gnuplot/gnuplot-faq.html)

GRIDTOOL

The purpose of "*GRIDTOOL*" is to bridge the gap between the CAD and the grid generation systems. GRIDTOOL is designed primarily for unstructured grid generation systems. Currently, GRIDTOOL supports VGRID and FELISA systems, and it can be easily extended to support other unstructured grid generation systems.

Application Name: **gridtool**

For Further Information: (http://geolab.larc.nasa.gov/GridTool/)

Appendix A.6 Visualization Package Descriptions continued

IDL

"IDL (Interactive Data Language), is recognized as a core technology for data visualization with over 150,000 users worldwide. ENVI, RSI's Best-in-Class remote sensing software created with IDL, is the undisputed leader in spectral image analysis."

Application Name: **idl**

For Further Information: (http://www.rsinc.com/)

IMTOOLS

"*IMTOOLS* are San Diego Supercomputer Center (SDSC) image manipulation tools. They were developed to handle image manipulation and file format conversion for a wide range of file formats."

Application Names:

imadjust:	for adjusting image colors, desaturate, brighten, etc.
imcat:	for concatenating images into multi-image files.
imcltroll:	to cycle a color lookup table.
imcomp:	to digitally composite images.
imconv:	for the image file conversion routine.
imcopy:	to copy a portion of an image to a new file.
imdissolve:	dissolve any field between two images and store in a new file.
imfile:	to discern the image format of a file.
imfill:	to fill a region of an image with a color or gradient.
imflip:	flips images vertically or horizontally.
imformats:	lists information on image file formats.
imgray:	converts an image to grayscale.
imhist:	computes an image histogram.
imkey:	keys a foreground image over a background image.
imlighten:	lighten or darken an image.
immono:	converts an image to monochrome.
impaste:	paste image on background and store in file.
Imroll:	cycles an image horizontally or vertically.
imrotate:	rotate an image.
imscale:	scale an image and store in a file.
imshear:	shear an image horizontally or vertically.
imsplit:	split apart multi-image files.
imstoryboard:	paste images together to create a storyboard.

For additional information: (http://www.vpl.umd.edu/pkgs/imtools.html)

Appendix A.6 Visualization Package Descriptions continued

KHOROS PRO

"*KHOROS PRO 2001"* supports multi-platform support, you can manage large-scale, complex software systems and integrate a diverse software base into a uniform framework. Khoros Pro delivers flexible functionality in a variety of application areas:

- Software Development Environment Manage all stages of the software life-cycle, from prototyping to evaluation to deployment.
- System Integration Environment Integrate Complex code into a single seamless environment.
- Visual Programming Environment Rapidly prototype solutions using the visual programming language Cantata.

Cantata is a graphically expressed, data flow visual language that provides a visual programming environment within the Khoros system. Data flow is a "naturally visible" approach in which a visual program is described as a directed graph, where each node represents an operator or function and each directed arc represents a path over which data flows."

Application Name: **cantata** or **khoros**

For Additional information: (http://www.khoral.com)

MAPLE 6

"*MAPLE 6"* is a powerful interactive computer algebra system that provides a complete mathematical environment for the manipulation of symbolic algebraic expressions, arbitrary-precision numerics, both two-dimensional and three-dimensional graphics, and programming.

Application Name: **maple** (Interactive computer algebra system)
xmaple (Interactive computer algebra system with GUI)
mint (Produce syntax and usage report of a Maple program)

For Additional Information: (http://www.waterloomaple.com)
(http://www.waterloomaple.com/support/Faqs/index.html)

MATHEMATICA

"*MATHEMATICA* is a fully integrated environment for technical computing. Mathematica has become important in a remarkably wide range of fields. Mathematica is used today throughout the sciences--physical, biological, social, and other--and counts many of the world's foremost scientists among its enthusiastic supporters. It has played a crucial role in many important discoveries and has been the basis for thousands of technical papers. In engineering, Mathematica has become a standard tool for both development and production, and by now many of the world's important new products rely at one stage or another in their design on Mathematica. In commerce, Mathematica has played a significant role in the growth of sophisticated financial modeling, as well as being widely used in many kinds of general planning and analysis. Mathematica has also emerged as an important tool in computer science and software development: its language component is widely used as a research, prototyping, and interface environment."

Application Name: **mathematica**

For additional information: (http://www.wolfram.com)
(http://support.wolfram.com)

Appendix A.6 Visualization Package Descriptions continued

MATLAB

"*MATLAB"* is an integrated technical computing environment that combines numeric computation, advanced graphics and visualization, and a high-level programming language.

MATLAB includes hundreds of functions for:

- Data analysis and visualization
- Numeric and symbolic computation
- Engineering and scientific graphics
- Modeling, simulation, and prototyping
- Programming, application development, and GUI design"

Application Name: **matlab** *[-nojvm –nodesktop –no splash]*

For additional information: (http://www.mathworks.com)
(http://www.mathworks.com/support)

OpenGL VizServer

"*OpenGL VIZSERVER*™ is a technical computing solution designed to deliver advanced visualization capabilities and performance to the desktop. Implementing the Silicon Graphics® Onyx3® visualization workstation as a graphics server, Vizserver allows users to view and interact with large data sets from a desktop system at any location in an organization. Vizserver is designed primarily for users involved in scientific data visualization, including seismic data analysis, and in manufacturing design and engineering. Vizserver enables a single Onyx3 workstation to distribute visualization sessions to multiple UNIX® operating system desktop workstations. Onyx3 systems support concurrent, real-time processing of complex 3D graphics, rich 2D imagery, and ultrahigh-resolution video for the world's fastest, most realistic visualization. With Vizserver, graphics processing is handled entirely on the Onyx3 workstation, saving customers money by allowing them to leverage Onyx3 capabilities through the use of Silicon Graphics® Octane®, O2®, and other UNIX desktop systems. Please contact SVL staff to schedule use of this product.

Application Name: **vizserver**

For additional information: (http://www.sgi.com/software/vizserver/)

Appendix A.6 Visualization Package Descriptions continued

PRO/ENGINEER

"*Pro/ENGINEER"* Solutions are a suite of integrated software products, which streamline engineering processes, optimizing product quality, decreasing design-through-manufacturing costs, and reducing time to market.

Direct Modeling - *"Pro/ENGINEER"* lets you create and modify features interactively, with minimal user interface interaction and mouse travel. With these direct modeling improvements, rounds, protrusions and cuts can be quickly created and modified with a click and drag of the mouse. Changes can be made by clicking and dragging the feature section, editing the dimensional value directly on-screen, or selecting from an intelligent drop-down list of most recently entered values. Combined with the power of "*Pro/ENGINEER's*" underlying feature agility, these user interaction advances allow the user to stay focused on the most important task of all - designing!

Application Name: **proeng**

For further information: (http://www.ptc.com)

PV-WAVE

"*PV-WAVE"* is the industry's leading Visual Data Analysis (VDA) solution used by business professionals from around the world. Scientists, researchers, educators, engineers, application developers, Intranet managers, testers and analysts' use PV-WAVE to solve problems, identify business trends and share results. PV-WAVE allows you to easily view, analyze and compare data for the following business, science and engineering applications: Aerospace and Defense, Biomedical and Pharmaceuticals, Computers and Electronics, Earth Sciences and Energy, Environmental and Weather Analysis, Financial Analysis, Manufacturing, Medical Imaging, and Process Control. PV-WAVE's easy-to-learn, easy-to-use interface quickly organizes and displays plots, contours, histograms and tables in multiple dimensions. The software requires no programming, allowing you to visualize rows and columns of numbers with color and animation by simply "pointing-and-clicking." Enhance Your Internet and Intranet Distributed Server Projects. PV-WAVE supports your organization's diverse Internet/intranet applications. Choose a variety of tools to effectively manage distributed information directly from your desktop. Run a PV-WAVE session over the Internet using your Java-enabled browser. Use PV-WAVE as a helper app with your browser. Create graphics for use on your Website.

Application Name: **wave**

For additional information: (http://www.vni.com)
(http://www.vni.com/tech/pvw/tips.html)

Appendix A.6 Visualization Package Descriptions continued

TECPLOT with CFD Analyzer

"*TECPLOT"* is a powerful plotting program for visualizing and analyzing engineering and scientific data. The standard version includes XY, 2D and 3D-surface plotting and a powerful capability to visualize 3D volumetric data. Tecplot is for Computational and Experimental Physics: fluid dynamics, electromagnetics, heat conduction, neutron flux, ground water flow. Engineering mechanical, civil, automotive, aeronautical, electrical, petroleum. Sciences: oceanography, medical imaging, biology, earth sciences, geography, and geophysics. "**CFD Analyzer**" is available within the ASC MSRC for Tecplot. When you're analyzing CFD data with Tecplot**, "*CFD Analyzer*"** saves you time finding, extracting and processing the critical information. **CFD Analyzer** provides many of the functions commonly used to calculate variables and perform integrations

Application Name: **tecplot,** CFD Analyzer loads automatically.

For additional information: (http://www.amtec.com)
(http://www.amtec.com/Service_pages/serv1a.html)

Unigraphics

"UNIGRAPHICS" provides an integrated and comprehensive family of total product engineering solutions that enable the user to digitally create and capture 3D product definitions. Unigraphics is used by many of the world's leading manufacturers to perform conceptual, industrial and detailed mechanical design along with engineering simulation and digital manufacturing

Application Names: **ug, ugmenu**
For Additional Information: (http://www.unigraphics.com/)

Appendix A.6 Visualization Package Descriptions continued

Vis5D

"*VIS5D*" is a system for interactive visualization of large 5-D gridded data sets such as those produced by numerical weather models. One can make isosurfaces, contour line slices, colored slices, volume renderings, etc of data in a 3-D grid, then rotate and animate the images in real time. There's also a feature for wind trajectory tracing, a way to make text annotations for publications, support for interactive data analysis, etc.

Application Names: **vis5d, vis5d+**

Vis5d+ is Stereo Capable 

For Additional Information: Vis5D (http://www.ssec.wisc.edu/~billh/vis5d.html)
For Additional Information: Vis5D+ (http://vis5d.sourceforge.net/)

A.7 ImmersaDesk

"The ImmersaDesk, originally by Pyramid Systems, is a revolutionary, drafting-table style, projection-based virtual reality tool. Wearing special glasses, a user can look into the ImmersaDesk's 4'x 5' angled screen to "see, hear and touch" a computer-generated 3-D image that is simulated with near-perfect accuracy. Both elevation and birds-eye-view are possible.

The ImmersaDesk -- **a semi-immersive virtual reality experience** -- is portable, yet large enough to fill a person's field of view. That is, it successfully achieves the illusion of an immersive virtual environment without fully surrounding the user. Portability is a major design advantage of the ImmersaDesk, making it flexible and affordable for a wide range of organizations.

A detailed description of ImmersaDesk benefits include:

- Rapid Prototyping -- The ImmersaDesk can help feed specialized computer files into machines that manufacture prototype parts. The ImmersaDesk interfaces to industry standard Computer Aided Design output files.

- Collaborative Design Over Distances -- Multiple users can "video conference" from different locations into the same ImmersaDesk virtual environment.

- Connectivity To Supercomputers -- The ImmersaDesk links with number-crunching computers to quickly, easily create a broad spectrum of complex virtual environments.

- Connectivity To Other Virtual Reality Devices -- Users can link ImmersaDesks with other VR technologies, such as the CAVE, to experience the same virtual environment."

Additional information:(http://www.fakespacesystems.com)
(http://www.vrco.com)

A.8 UNIX: Helpful Guide & links

Common Commands

Command	Usage	Info
acroread	acroread <source>.pdf	UNIX pdf file reader
cp	cp <source> <target>	file copy
finger	finger <user_name>	retrieve user data
gzip	gzip <file>	compress a file
gunzip	gunzip <file>.gz	uncompress a file
lp	lp <printer_file> <-*t stat*>	default printer / status
ls	ls <–*l*>	list long directory contents
mkdir	mkdir <new_directory>	create directory
quota	quota –v	show storage limit
rmdir	rmdir <old_directory>	removes directory
printers	printers	GUI printers available
rm	rm <filename>	removal of file* (this is permanent)
rcp	rcp <file> machine:<file>	
tar	tar –cvf <target>.tar <source>	create a new compressed file
tar	tar –xvopf <source>.tar	uncompress a tar file
top	top	show user activity (‘q’ exits)
whoami	whoami	identify user
$WRK	cd $WRK	go to workspace directory
$ARC	cd $ARC	go to SVL or HPC archive directory
$HOME	cd $HOME	go to SVL or HPC home directory
archive	archive put <file> archive get <file>	write/read files to /workspace/<*username*>
safeftp	safeftp host:<file> host:<file>	type “man safeftp” for info
bg	bg [job id]	place process in background
fg	fg [job id]	bring process to foreground
osview	osview	monitor operating system activity
gr_osview	gr_osview	graphical system monitor
man	man <-k command>	command/program information

Useful UNIX link:

UNIX HELP -http://cmtq0.harvard.edu/Documentation/Unixhelp/TOP_.html

A.9 List of Acronyms

ABI	**A**pplication **B**inary **I**nterfaces
ASC MSRC	**A**eronautical **S**ystems **C**enter **M**ajor **S**hared **R**esource **C**enter
AVI	**A**udio/**V**ideo **I**nterleave
BMP	Windows **B**it**M**a**p** file
CAVE	**C**ave **A**utomatic **V**irtual **E**nvironment
CD-RW	**C**ompact **D**isc **R**ead **W**riteable
CFD	**C**omputational **F**luid **D**ynamics
CPU	**C**entral **P**rocessing **U**nit
DCs	**D**istributed **C**enters
DICE	**D**istributed **I**nteractive **C**omputing **E**nvironment
DPLEX	**D**igital **V**ideo **M**ultiplexer
E-News	**E**lectronic **N**ewsletter
EPS	**E**ncapsulated **P**ost**S**cript
ET	**E**astern **T**ime
FAQ	**F**requently **A**sked **Q**uestions
GIF	**G**raphics **I**nterchange **F**ormat
GrADS	**G**rid **A**nalysis and **D**isplay **S**ystem
GUI	**G**raphical **U**ser **I**nterface
HPCMP	**H**igh **P**erformance **C**omputing **M**odernization **P**rogram
JPEG	**J**oint **P**hotographic **E**xperts **G**roup
JPG	**J**oint **P**hotographic Experts **G**roup
LCD	**L**iquid **C**rystal **D**isplay
MPEG	**M**otion **P**ictures **E**xpert **G**roup
MSRCs	**M**ajor **S**hared **R**esource **C**enters
PCL	Hewlett Packard **P**rinter **C**ontrol **L**anguage
PDF	**P**ortable **D**ocument **F**ormat
PICT	**Pict**ure **G**raphics **F**ile **F**ormat
PS	**P**ost**S**cript® Format
RGB	SGI Image File Format
RSH	**R**emote **S**hell
SDSC	**S**an **D**iego **S**upercomputer **C**enter
SGI	**S**ilicon **G**raphics **I**ncorporated
SMP	**S**ymmetric **M**ulti**P**rocessing
SSH	**S**ecure **Sh**ell
SVL	**S**cientific **V**isualization **L**aboratory
TARGA	**Targa G**raphic **F**ile **F**ormat
TIFF	**T**agged-**I**mage **F**ile **F**ormat
VDA	**V**isual **D**ata **A**nalysis
VME	**V**ersa **M**odule **E**urope
VR	**V**irtual **R**eality
XTERM	**X** Window System **T**erminal Emulator